AMENDMENTS TO THE CLAIMS

1. (Original) A method for identifying a denomination of a currency bill, comprising the steps of:

providing a mask for each given denomination among a plurality of different currency denominations, said mask indicating expected brightness levels of pixels in images of bills of said given denomination;

capturing an image of said currency bill;

correlating brightness levels in pixels of said captured image with said mask so as to determine matching scores for said different currency denominations; and

comparing said matching scores so as to assign one of said different currency denominations to said currency bill.

2. (Original) The method according to claim 1, wherein said step of comparing said matching scores comprises the steps of:

selecting a highest one of said matching scores;

determining whether said highest one of said matching scores exceeds a threshold; and

responsively to said step of determining identifying said currency bill with said one of said different currency denominations corresponding to said highest one of said matching scores.

3. (Original) The method according to claim 2, wherein said threshold has a predetermined value.

4. (Original) The method according to claim 2, wherein said threshold depends on said one of said different currency denominations corresponding to said highest one of said matching scores.

5. (Original) The method according to claim 1, wherein said matching scores are correlation coefficients.

6. (Original) The method according to claim 1, wherein a spatial resolution of said captured image does not exceed 10 dpi.

7. (Currently amended) The method according to ~~any of the preceding claims~~ claim 1, wherein said captured image is a grey-scale image.

8. (Original) The method according to claim 7, wherein a spatial resolution of said captured image does not exceed 10 dpi.

9. (Original) The method according to claim 7, wherein a brightness resolution of said captured image does not exceed 12 bits per pixel.

10. (Original) The method according to claim 7, wherein a brightness resolution of said captured image does not exceed 6 bits per pixel.

11. (Currently amended) The method according to ~~any of claims 1-6~~ claim 1, wherein said captured image comprises a plurality of captured images corresponding to different facings and orientations of said currency bill.

12. (Original) A computer software product, comprising a computer-readable medium in which computer program instructions are stored, which instructions, when read by a computer, cause the computer to perform a method for identifying a denomination of a currency bill, comprising the steps of:

generating a mask for each given denomination among a plurality of different currency denominations, said mask

indicating expected brightness levels of pixels in images of bills of said given denomination;

capturing an image of said currency bill;

correlating brightness levels in pixels of said captured image with said mask so as to determine matching scores for said different currency denominations; and

comparing said matching scores so as to assign one of said different currency denominations to said currency bill.

13. (Original) The computer software product according to claim 12, wherein in said step of comparing said matching scores wherein said computer is further instructed to perform the steps of:

selecting a highest one of said matching scores;

determining whether said highest one of said matching scores exceeds a threshold; and

responsively to said step of determining identifying said currency bill with said one of said different currency denominations corresponding to said highest one of said matching scores.

14. (Original) The computer software product according to claim 13, wherein said threshold depends on said one of said different currency denominations corresponding to said highest one of said matching scores.

15. (Original) The computer software product according to claim 13, wherein a spatial resolution of said captured image does not exceed 10 dpi.

16. (Original) The computer software product according to claim 13, wherein said captured image is a grey-scale image.

17. (Original) The computer software product according to claim 16, wherein a spatial resolution of said captured image does not exceed 10 dpi.

18. (Original) The computer software product according to claim 16, wherein a brightness resolution of said captured image does not exceed 12 bits per pixel.

19. (Original) The computer software product according to claim 16, wherein a brightness resolution of said captured image does not exceed 6 bits per pixel.

20. (Currently amended) The computer software product according to ~~any of claims 12-19~~ claim 12, wherein said captured image comprises a plurality of captured images corresponding to different facings and orientations of said currency bill.

21. (Original) An apparatus for identifying a denomination of a currency bill, comprising:
a transport mechanism for conveying said currency bill along a transport path;
an imaging subsystem for capturing an image of said currency bill while said currency bill is on said transport path; and
a decisional logic subsystem that evaluates said captured image for identification thereof, wherein said decisional logic subsystem is adapted to compare said captured image to masks indicating expected brightness levels of pixels in images of bills of said given denomination so as to determine respective matching scores for different currency denominations; and to compare said matching scores so as to assign one of said different currency denominations to said currency bill.

22. (Original) The apparatus according to claim 21, wherein said imaging subsystem further comprises a light source and a light detector that is responsive to said light source, and is positioned relative said light source such that said captured image is a reflectance image.

23. (Original) The apparatus according to claim 22, wherein said light source produces a beam of visible light, wherein said currency bill is in a path of said beam.

24. (Original) The apparatus according to claim 22, wherein said light source produces a beam of infrared light, wherein said currency bill is in a path of said beam.

25. (Original) The apparatus according to claim 24, wherein said captured image is a grey-scale image having a brightness resolution that does not exceed 12 bits per pixel.

26. (Original) The apparatus according to claim 24, wherein said captured image is a grey-scale image having a brightness resolution that does not exceed 6 bits per pixel.

27. (Currently amended) The apparatus according to any of claims 21-26 claim 21, wherein said imaging subsystem further comprises a light source and a light detector that is responsive to said light source, and is positioned relative said light source such that said captured image is a transmittance image.

28. (Original) The apparatus according to claim 27, wherein said light source produces a beam of visible light, wherein said currency bill is in a path of said beam.

29. (Original) The apparatus according to claim 28, wherein said captured image is a grey-scale image having a brightness resolution that does not exceed 12 bits per pixel.

30. (Original) The apparatus according to claim 28, wherein said captured image is a grey-scale image having a brightness resolution that does not exceed 6 bits per pixel.

31. (Currently amended) The apparatus according to ~~any of claims 21-26~~ claim 21, wherein said decisional logic subsystem is adapted to compute a correlation coefficient between said captured image and said masks.

32. (Currently amended) The apparatus according to ~~any of claims 21-26~~ claim 21, wherein said captured image comprises a plurality of captured images corresponding to different facings and orientations of said currency bill.

33. (Original) A method for determining a denomination of a currency bill, comprising the steps of:

providing a white mask and a black mask for each given denomination among a plurality of different currency denominations, said white mask for said given denomination indicating pixels that are likely to appear bright in images of bills of said given denomination, and said black mask for said given denomination indicating pixels that are likely to appear dark in said images of said bills of said given denomination;

capturing an image of said currency bill;

comparing said captured image to said white mask and said black mask for each of said plurality of different currency denominations so as to determine respective matching scores for said different currency denominations; and

comparing said matching scores so as to assign one of said different currency denominations to said currency bill.

34. (Original) The method according to claim 33, wherein said captured image is a reflectance image that is captured using visible light at a spatial resolution that does not exceed 10 dpi.

35. (Original) The method according to claim 33, wherein said captured image is a reflectance image that is captured using infrared light at a spatial resolution that does not exceed 10 dpi.

36. (Original) The method according to claim 33, wherein said captured image is a transmittance image that is captured using visible light at a spatial resolution that does not exceed 10 dpi.

37. (Original) The method according to claim 33, wherein said captured image is a transmittance image that is captured using infrared light at a spatial resolution that does not exceed 10 dpi.

38. (Original) The method according to claim 33, wherein said currency bill is assigned to one of said different currency denominations by associating an identification code therewith.

39. (Original) The method according to claim 38, further comprising the step of presenting said identification code on a display device.

40. (Currently amended) The method according to ~~any of claims 33-39~~ claim 33, wherein said image of said currency bill comprises an entire area thereof.

41. (Currently amended) The method according to ~~any of claims 33-39~~ <u>claim 33</u>, wherein said image of said currency bill comprises at least one selected sub-area thereof.

42. (Currently amended) The method according to ~~any of claims 33-39~~ <u>claim 33</u>, wherein said captured image has a brightness resolution of 1 bit per pixel.

43. (Original) The method according to claim 42, wherein said step of comparing said captured image comprises the steps of:

performing a pixel-by-pixel logical AND operation between said captured image and said white mask and between an inversion of said captured image and said black mask; and

determining a number of pixels in which there is concordance between pixels of said captured image and corresponding pixels of said white mask and between pixels of said inversion of said captured image and corresponding pixels of said black mask.

44. (Currently amended) The method according to ~~any of claims 33-39~~ <u>claim 33</u>, wherein said image has a brightness resolution that exceeds 1 bit per pixel.

45. (Currently amended) The method according to ~~any of claims 33-39~~ <u>claim 33</u>, wherein said pixels in said white mask and in said black mask that are likely to be white and black, respectively, are white and black, respectively, on at least a predetermined proportion of specimens of said given denomination.

46. (Currently amended) The method according to ~~any of claims 33-39~~ <u>claim 33</u>, further comprising the step of

assigning a brightness level of said pixels by binarization.

47. (Currently amended) The method according to ~~any of claims 33-39~~ claim 33, wherein said step of comparing said captured image comprises the steps of:

identifying a highest one of said matching scores;

identifying a second highest one of said matching scores;

calculating a difference between said highest one of said matching scores and said second highest one of said matching scores; and

responsively to said difference identifying said currency bill as one of said different currency denominations that corresponds to said highest one of said matching scores.

48. (Original) A method for identifying a currency bill, comprising the steps of:

providing a plurality of discriminators for each given denomination among a plurality of different currency denominations;

capturing an image of said currency bill;

scoring said captured image according to said discriminators for each of said plurality of different currency denominations so as to determine respective matching scores for said different currency denominations; and

comparing said matching scores so as to assign one of said different currency denominations to said currency bill.

49. (Original) The method according to claim 48, wherein said step of scoring is performed by determining a correlation coefficient between said captured image and said discriminators for each said given denomination.

50. (Currently amended) The method according to claim 48 or 49, wherein said discriminators comprise tables, wherein each entry of said tables is associated with a corresponding pixel of said captured image, and represents a probability that said corresponding pixel is one of black and white on said given denomination.

51. (Original) The method according to claim 50, wherein elements of one of said discriminators and elements of another of said discriminators each comprise one of a first value and a second value, wherein said first value signifies that said probability is higher than a first threshold value, and said second value signifies that said probability is lower than a second threshold value.

52. (Original) The method according to claim 51, wherein said first threshold value is equal to said second threshold value.

53. (Original) A computer software product, comprising a computer-readable medium in which computer program instructions are stored, which instructions, when read by a computer, cause the computer to perform a method for determining a denomination of a currency bill, comprising the steps of:

generating a white mask and a black mask for each given denomination among a plurality of different currency denominations, said white mask for said given denomination indicating pixels that are likely to appear bright in images of bills of said given denomination, and said black mask for said given denomination indicating pixels that are likely to appear dark in said images of said bills of said given denomination;

memorizing a captured image of said currency bill;

comparing said captured image to said white mask and said black mask for each of said plurality of different currency denominations so as to determine respective matching scores for said different currency denominations;

comparing said matching scores ; and

responsively to said step of comparing assigning one of said different currency denominations to said currency bill.

54. (Original) The computer software product according to claim 53, wherein said currency bill is assigned to one of said different currency denominations by associating an identification code therewith.

55. (Original) The computer software product according to claim 53, wherein said step of comparing said captured image comprises the steps of:

performing a pixel-by-pixel logical AND operation between said captured image and said white mask and between an inversion of said captured image and said black mask; and

determining a number of pixels in which there is concordance between pixels of said captured image and corresponding pixels of said white mask and between pixels of said inversion of said captured image and corresponding pixels of said black mask.

56. (Original) The computer software product according to claim 53, wherein said pixels in said white mask and in said black mask that are likely to be white and black, respectively, are white and black, respectively, on at least a predetermined proportion of specimens of said given denomination.

57. (Original) The computer software product according to claim 53, wherein said computer is further instructed to

perform the step of assigning a brightness level of said pixels by binarization.

58. (Currently amended) The computer software product according to ~~any of claims 53-57~~ claim 53, wherein said step of comparing said captured image comprises the steps of:

identifying a highest one of said matching scores;

identifying a second highest one of said matching scores;

calculating a difference between said highest one of said matching scores and said second highest one of said matching scores; and

responsively to said difference identifying said currency bill as one of said different currency denominations that corresponds to said highest one of said matching scores.

59. (Original) An apparatus for identifying a denomination of a currency bill, comprising:

a transport mechanism for conveying said currency bill along a transport path;

an imaging subsystem for capturing an image of said currency bill while said currency bill is on said transport path; and

a decisional logic subsystem that evaluates said captured image for identification thereof, wherein said decisional logic subsystem maintains a white mask and a black mask for each given denomination among a plurality of different currency denominations, said white mask for said given denomination indicating pixels that are likely to appear bright in images of bills of said given denomination, and said black mask for said given denomination indicating pixels that are likely to appear dark in said images of said bills of said given denomination; and wherein said decisional logic subsystem

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is adapted to compare said captured image to said white mask and said black mask for each of said plurality of different currency denominations so as to determine respective matching scores for said different currency denominations; and to compare said matching scores so as to assign one of said different currency denominations to said currency bill.

60. (Original) The apparatus according to claim 59, wherein said imaging subsystem further comprises a light source and a light detector that is responsive to said light source and is positioned relative said light source such that said captured image is a reflectance image.

61. (Original) The apparatus according to claim 60, wherein said light source produces a beam of visible light.

62. (Original) The apparatus according to claim 60, wherein said light source produces a beam of infrared light.

63. (Original) The apparatus according to claim 59, wherein said imaging subsystem further comprises a light source and a light detector that is responsive to said light source and is positioned relative said light source such that said captured image is a transmittance image.

64. (Original) The apparatus according to claim 63, wherein said light source produces a beam of visible light.

65. (Original) The apparatus according to claim 63, wherein said light source produces a beam of infrared light.

66. (Original) The apparatus according to claim 59, wherein said captured image has a brightness resolution of 1 bit per pixel.

67. (Original) The apparatus according to claim 66, wherein said decisional logic subsystem is adapted to perform a pixel-by-pixel logical AND operation between said captured image and said white mask and between an inversion of said captured image and said black mask; and to determine a number of pixels in which there is concordance between pixels of said captured image and corresponding pixels of said white mask and between pixels of said inversion of said captured image and corresponding pixels of said black mask.

68. (Currently amended) The apparatus according to ~~any of claims 59-67~~ claim 59, wherein said pixels in said white mask and in said black mask that are likely to be white and black, respectively, are white and black, respectively, on at least a predetermined proportion of specimens of said given denomination.

69. (Currently amended) The apparatus according to ~~any of claims 59-67~~ claim 59, wherein said imaging subsystem further comprises binarizing circuitry for assigning a brightness level of said pixels.

70. (Currently amended) The apparatus according to ~~any of claims 59-67~~ claim 59, wherein said decisional logic subsystem is further adapted to compare said captured image by performing the steps of:
    identifying a highest one of said matching scores;
    identifying a second highest one of said matching scores;

calculating a difference between said highest one of said matching scores and said second highest one of said matching scores; and

responsively to said difference identifying said currency bill as one of said different currency denominations that corresponds to said highest one of said matching scores.